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IRAC-IR&DC-7/74
5 December 1974

THE INTELLIGENCE RESEARCH & DEVELOPMENT COUNCIL

MEMORANDUM FOR MEMBERS OF THE INTELLIGENCE RESEARCH
AND DEVELOPMENT COUNCIL

SUBJECT: Subcommittee Report on Research and Development
Applicable to Intelligence Processing, Analysis, and
Information Presentation

1. Following Mr. Goulder's subcommittee report to the Council
at the 3 December 1974 meeting, the Chairman requested that the
members review the attached proposal, identify key issues in areas
under their cognizance, and comment attendant thereto at the 7 January
1975 session.

2. The attached documents which were circulated informally
among the members in attendance at the 3 December meeting are
forwarded for record purposes.

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Executive Secretary

Attachments:
Proposal for Review of R&D Programs Applicable to Intelligence
Processing, Analysis, and Information Presentation
Page from 22 July 1974 Report to the Chairman, IRAC, re Analysis

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3 December 1974

PROPOSAL FOR REVIEW OF R&D PROGRAMS
APPLICABLE TO INTELLIGENCE PROCESSING,
ANALYSIS AND INFORMATION PRESENTATION

The costs and the volume of intelligence information acquired,
processed, analyzed and disseminated demand a continuing effort to
improve the effectiveness with which raw data are exploited and with
which intelligence is presented to consumers. Effective application
of R&D resources to processing, analysis and display problem areas
is essential if the return expected from the major investment in
collection is to be realized. A review of the use of R&D resources
is proposed. This paper proposes objectives for such a review,
identifies known problem areas and recommends a course of action.

Statement of Objectives

- Identify potential problem areas

- Survey recent significant technology development for appli-
  cation to processing, analysis and display problems

- Select for detailed review, problem areas that:

  - Appear to need cross program coordination, or
  - Have potentially high payoff for application of R&D
    resources, or
  - . Can benefit from recent technology, or
  - Can otherwise benefit from Council support

- Prepare for Council review, recommendations resulting from
  these activities

Potential Problem Areas

- Image Processing

  Digital Image Manipulation
  Automated Pattern Recognition and Change Detection
  Image Enhancement
  Radar Imagery Exploitation

- SIGINT Processing

    Automated Translation
    "Exotic" Signal Processing
    Signal Pre-Processing Selection and Conditioning

- ADP Technology

    Queue Management
    Associative Processing
    Massive Memory Development

- Use of Analytical Techniques

    Modeling
    Simulation
    Resource Allocation
    Decision Analysis

- Data Presentation and Display

    Crisis Management Requirements Impact
    Essential Information for Decision Makers
    Real-Time Interaction Techniques

- Data Communications

    Electrical Data Distribution
    Adaptive Transforms for Bandwidth Reduction
    Computer/Network Internetting
    Multi-Level Security

- Analyst Support

    Interactive Analyst Terminal Progress
    Common File-Retrieval Language
    Distributed Data Base Programs

Recommended Actions

- Catalog and exchange information on current or planned
  R&D projects concerned with processing, analysis and
  display techniques.

- Survey recent significant technology development for application to processing, analysis and display problem areas.

- Select a few items from the problem area list which meet the review criteria. Suggestions are: Interactive Analyst Support System Developments; Exploitation of potential benefits available from application of computer-based analytical techniques to intelligence problems (i. e. resource allocation, analyst data evaluation, and decision-making processes); and Mass Memory Development and Application.

- For each item selected, conduct the review and document findings. The reviews will be structured by this Committee and the results reported to the Council.

- Prepare a register of additional problem areas worthy of review and proceed as above.

Attachment:
Detailed Problem List

DETAILED PROBLEM EXAMPLES

1. Processing

    a. Digital image manipulation

    b. Automated translation

    c. Automated pattern recognition and change detection for
        imagery processing.

    d. Electronic data distribution from collection to processing
        center as opposed to magnetic tape and hard copy distributed
        by mail and freight.

    e. Can a common file -- retrieval language -- be developed that
        will permit its use for a variety of applications instead of
        our current approach of redesigning the system for each job?

    f. R&D to automatically convert files to common vocabulary.

    g. Automatic transformation of common access language to
        local file language to facilitate multiple user access to diverse
        file systems.

    h. Adaptive transforms to reduce transmission bandwidth of
        information.

2. Exploitation and Analysis

    a. Analytical Technique Development

        (1) Dynamic Economic Modeling

        (2) Crop Production Estimation

        (3) Resource Intelligence Techniques -- Oil
                                                -- Minerals

        (4) Behavioral Modeling

(5) Policy Analysis -- Bureaucratic Behavior
                      -- Decision Making

(6) Indicator Intelligence

(7) Nuclear Environment Effects

(8) Deception Anticipation and Detection

(9) Dynamic Tactical Warfare Modeling

(10) ASW Force Modeling

(11) Inferential Network Analysis

(12) Measures of Weapon Systems Effectiveness

b. R&D on tools to help analysts to access files, collate data, derive trends.

c. R&D on better methods of presenting data to various levels of users in forms that will be more meaningful and useful to the users.

d. R&D on tools for the utility of providing real-time interaction between scientists, analysts, decision makers, and their data bases.

e. R&D to determine the trade-offs between quantity of data versus depth of analysis and how to better apportion our expenditures.

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